Trend Study 14-9-99

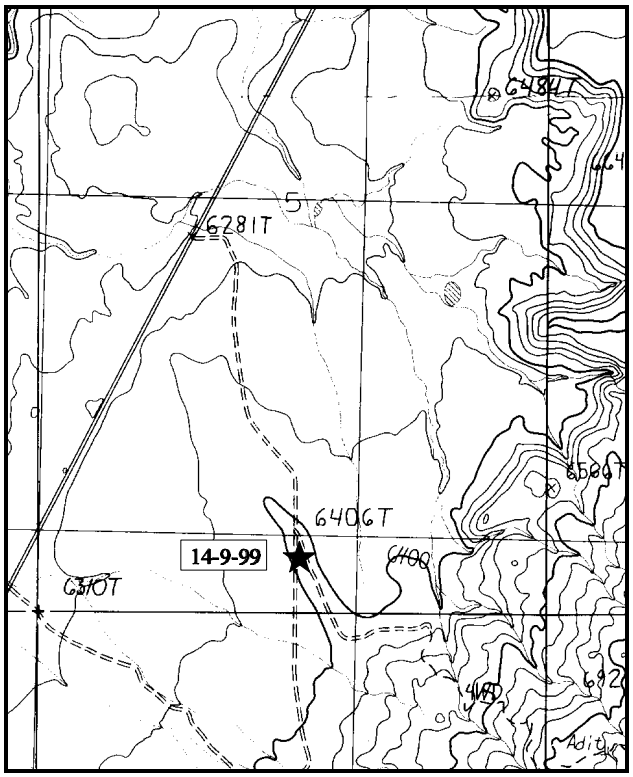
Study site name: Harts Draw . Range type: Big Sagebrush-Grass .

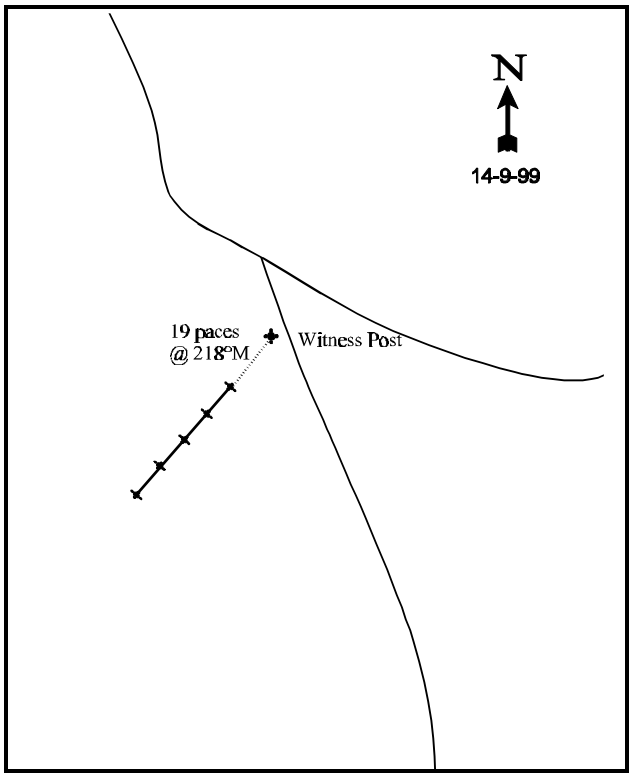
Compass bearing: frequency baseline 180°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

Go north from Monticello on SR 191 to the turnoff to Canyonlands National Park (0.3 miles north of mile marker 86). Turn left (west) onto SR-211 and proceed approximately 4.0 miles to mile marker 14. Continue 0.15 miles past the mile marker, then turn left onto a dirt road that goes up and along a small ridge. Go 0.6 miles, bearing right at a faint fork and looking for two green fence posts on your left between the roads. The 0 ft baseline stake is near a small juniper.





Map Name: Photograph Gap Diagrammatic Sketch

Township 32S , Range 23E , Section 5 UTM 4208972.900 N, 638774.154 E

DISCUSSION

Trend Study No. 14-9 (35-9)

The Harts Draw range trend study is located in what is considered an important critical deer wintering area. The range is an extensive Wyoming big sagebrush type below the pinyon-juniper slopes of Peters Point mesa. The elevation is 6,400 feet with a 3% - 7% slope and southwest aspect. In the valley below the ridge, the sagebrush has been removed and the flat has been planted to crested wheatgrass. Cattle use the flat rather heavily, with sign of grazing less common further up the hill. The BLM currently allows 200-300 cattle in fall and spring. Deer pellet groups indicate moderate use and are especially common along the numerous dirt roads. A pellet group transect located nearby at an elevation of 6,600 feet continually shows the highest use of any transect on the herd unit with a 10 year average ('87-'97) of 91deer days use/acre (225 ddu/ha). Pellet group data from the trend study site in 1999 estimated 85 deer days use/acre (210 ddu/ha) and 7 cow days use/acre (17 cdu/ha).

Soil on the site is relatively shallow with an effective rooting depth estimated at a little over 13 inches. A compacted layer exists at 13 to 14 inches. Texture of the soil is a sandy loam with a reddish color and a slightly alkaline pH (7.6). There is very little rock or pavement on the surface or within the profile. Much of the sandy soil is exposed on the site. Large unprotected patches have little protection from high intensity summer storms. Grasses provide good protection against erosion where they occur, but as the amount of herbaceous vegetative and litter cover is low and variable, there are microsite problems. There are a few small gullies in the area which appear to be healing. Currently, erosion is not severe due to the gentle terrain.

Browse use in the area is centered on Wyoming big sagebrush, as it is the only palatable species present. It made up 90% of the browse cover in 1994, however declining to 67% by 1999. It appeared to have been used heavily in the past, with use in 1994 appearing severe because of the extremely depressed growth rate in conjunction with the prolonged drought since 1985. New leader growth was very short with virtually no seed production. Almost 50% of the sagebrush surveyed in 1994 were classified as decadent because of a partially dead crowns, but this was actually an improvement over 1986 figures. The balance were mature plants under two feet in height. Recruitment was poor with few seedling and young plants. Data from 1999 show a similar population density compared to 1986 and 1994. Utilization is moderate to heavy, but vigor has improved since 1994. Percent decadence has declined from 46% in 1994 to 33% in 1999. Reproduction continues to be poor with no seedlings and few young being sampled.

Broom snakeweed occurred frequently in 1986 and appeared to be increasing at the expense of perennial grasses. Density actually declined by 1994, mostly due to drought conditions. It has since increased dramatically from 5,480 plants/acre in 1994 to 19,600 in 1999. Cover of broom snakeweed has also increased four fold since 1994. It currently accounts for 28% of the total shrub cover. Most of the population (82%) consists of mature plants, although young plants are also abundant. Snakeweed is small in stature, unutilized, and in good vigor.

Grasses are moderately abundant for a Wyoming sagebrush community. They contributed 44% of the total vegetative cover in 1994, increasing to 58% by 1999. Blue grama, an increaser under spring cattle grazing, is fairly abundant on the site and forms thick low mats on the side hill. Other grasses include bottlebrush squirreltail, needle-and-thread, Indian ricegrass, and galleta. Two annual grass, cheatgrass brome and sixweeks fescue, are also present with cheatgrass increasing exponentially in nested frequency value and cover since 1994. Forbs are insignificant with a total cover of only about 1% in 1994 and 1999.

1986 APPARENT TREND ASSESSMENT

Use on much of the sagebrush in the Harts Draw area is heavy enough to cause reduced vigor. Dry growing season conditions are also responsible for the poor vigor. Decadence, no recruitment, and a decline of

sagebrush numbers on this important deer winter range indicate a downward trend. It is an especially serious condition if this trend is occurring over all the Harts Draw winter range. The bare soil, poor litter cover, and slight surface erosion combine to cause a downward soil trend.

1994 TREND ASSESSMENT

Soil trend for this site would have to be slightly downward because of the high percentage of bare ground and very low cover value for litter (<20%). The key browse species is Wyoming big sagebrush, which through the years has been heavily utilized. The slight increase in it's density estimate is mostly reflective of the much larger sample size taken in 1994, but there are some important improvements in some other critical population parameters. One of these improvements includes a biotic potential of 1%, for in 1986 there were no seedlings. Another of these improvements is that there is a slight increase in the number of plants that are classified as mature healthy plants. Yet another improvement is that percent decadence has decreased slightly. Any of these changes by themselves would not mean much, but together, the indication is that there is a slight improvement for Wyoming big sagebrush. The one negative characteristic of the community that did not show any improvement was the percent of the population that was classified as showing poor vigor which had increased from 16% to 32%. The increaser broom snakeweed has a population that has decreased by 57% even when it had a biotic potential of 27%. Trend for browse would be judged slightly down with the high percentage of the population showing poor vigor. This could turn around with normal weather patterns. The trend for grasses and forbs is difficult to determine. Since 1992, annual species are now inventoried along with the perennial species, therefore when one compares the nested frequency numbers from year to year and group to group (e.g., grass and forbs), comparisons should only include perennial species when comparing with older data sets. With this in mind, the trend would be stable. The forbs are showing a decrease, but the forbs are of little consequence on this site and only provide 4% of the total vegetative cover, while the grass stayed about the same and they contribute 44% of the total vegetative cover.

TREND ASSESSMENT
soil - slightly down
browse - slightly down
herbaceous understory - stable

1999 TREND ASSESSMENT

Trend for soil is up due to an increase in litter cover and a decline in percent bare ground. Sum of nested frequency of grasses also increased dramatically due primarily to cheatgrass. Trend for browse is mixed. Trend for the key browse species is considered up slightly due to a steady population density since 1994, improved vigor, and a decline in percent decadence from 46% to 33%. Reproduction is poor however, with no seedlings and few young sampled. Trend for broom snakeweed, an undesirable increaser, is up due to an explosive increase in density since 1994 (5,480 to 19,600 plants/acre). Taking all of these factors into consideration, trend for browse is considered down slightly. Trend for the herbaceous understory is down with cheatgrass increasing from a quadrat frequency of only 9% in 1994 to 97% in 1999. Cover of this undesirable winter annual has also increased dramatically. In 1994 it accounted for only 1% of the grass cover with a cover value of less than 1%. This increased to 13% cover (62% of the total grass cover) by 1999. Blue grama, a mat forming warm season perennial and increaser under grazing pressure, decreased significantly in nested frequency since 1994. Bottlebrush squirreltail increased significantly in frequency. Forbs are rare and unimportant on this site. All forbs combined have produced only 1% cove since 1994.

TREND ASSESSMENT
soil - up
browse - down slightly
herbaceous understory - down due to a dramatic increase in cheatgrass

HERBACEOUS TRENDS --
Herd unit 14 , Study no: 9

Type	Species	Nested Frequency '86	'94	'99	Quadrat Frequency '86	'94	'99	Average Cover % '94	'99
G	Agropyron cristatum	-	6	4	-	2	2	.03	.06
G	Bouteloua gracilis	$_{b}$165	$_{b}$130	77	62	44	29	5.41	2.97
G	Bromus tectorum (a)	-	$_{a}$16	$_{b}$344	-	9	97	.07	12.91
G	Hilaria jamesii	$_{a}$1	$_{a}$5	$_{b}$39	1	4	15	.04	1.52
G	Oryzopsis hymenoides	$_{a}$-	$_{b}$15	$_{b}$20	-	10	10	.39	.27
G	Sitanion hystrix	$_{a}$25	$_{b}$123	$_{c}$153	15	49	68	4.70	2.62
G	Stipa comata	$_{b}$81	$_{a}$-	$_{ab}$4	39	-	2	-	.04
G	Vulpia octoflora (a)	-	$_{b}$240	$_{a}$99	-	81	37	.55	.33
Total for Annual Grasses		0	256	443	0	90	134	0.62	13.24
Total for Perennial Grasses		272	279	297	117	109	126	10.59	7.50
Total for Grasses		272	535	740	117	199	260	11.21	20.75
F	Arnica mollis	$_{b}$7	$_{a}$-	$_{a}$-	3	-	-	-	-
F	Astragalus mollissimus	2	-	5	2	-	2	-	.06
F	Chenopodium spp. (a)	-	2	-	-	1	-	.00	-
F	Cryptantha spp.	$_{A}$-	$_{b}$12	$_{b}$20	-	6	8	.03	.23
F	Descurainia pinnata (a)	-	$_{b}$38	$_{a}$1	-	19	1	.09	.00
F	Eriogonum cernuum (a)	-	1	-	-	1	-	.00	-
F	Erigeron spp.	$_{B}$9	$_{a}$-	$_{a}$-	6	-	-	-	-
F	Erigeron pumilus	$_{b}$44	$_{a}$1	$_{a}$17	17	1	9	.03	.31
F	Gilia hutchinifolia (a)	-	$_{b}$20	$_{a}$8	-	11	4	.05	.02
F	Lappula occidentalis (a)	-	-	1	-	-	1	-	.00
F	Leucelene ericoides	$_{a}$-	$_{b}$10	$_{a}$-	-	4	-	.33	-
F	Lepidium spp. (a)	-	$_{b}$20	$_{a}$7	-	10	4	.42	.23
F	Orobanche fasciculata	-	-	4	-	-	2	-	.01
F	Sphaeralcea coccinea	$_{b}$52	$_{a}$14	$_{a}$13	23	5	5	.03	.05
Total for Annual Forbs		0	81	17	0	42	10	0.58	0.26
Total for Perennial Forbs		116	37	59	52	16	26	0.42	0.67
Total for Forbs		116	118	76	52	58	36	1.00	0.94

Values with different subscript letters are significantly different at % = 0.10

BROWSE TRENDS --
Herd unit 14 , Study no: 9

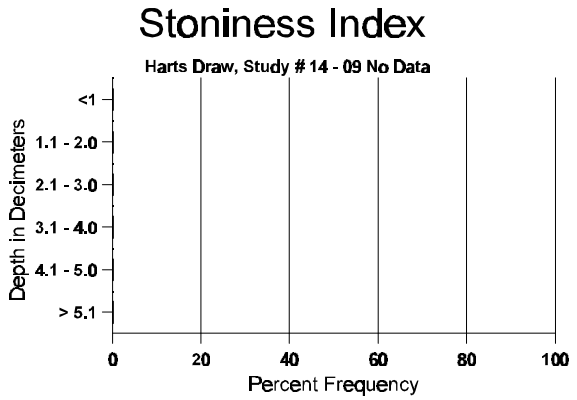
Type	Species	Strip Frequency '94	Strip Frequency '99	Average Cover % '94	Average Cover % '99
B	Artemisia tridentata wyomingensis	77	78	11.80	9.50
B	Chrysothamnus viscidiflorus stenophyllus	10	6	.18	.46
B	Gutierrezia sarothrae	70	94	1.02	3.95
B	Opuntia spp.	11	5	.04	.18
B	Sclerocactus	0	0	.01	-
Total for Browse		168	183	13.07	14.11

BASIC COVER --
Herd unit 14 , Study no: 9

Cover Type	Nested Frequency '94	Nested Frequency '99	Average Cover % '86	Average Cover % '94	Average Cover % '99
Vegetation	323	359	4.25	21.01	34.93
Rock	139	33	0	.45	.09
Pavement	187	177	8.25	1.01	2.01
Litter	370	366	35.75	18.98	30.61
Cryptogams	89	88	.75	1.52	1.99
Bare Ground	373	317	51.00	51.87	41.37

SOIL ANALYSIS DATA --
Herd Unit 14, Study # 09, Study Name: Harts Draw

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
13.4	61.8 (14.5)	7.6	72.9	12.6	14.6	1.3	8.8	51.2	0.4



PELLET GROUP DATA --
Herd unit 14 , Study no: 9

Type	Quadrat Frequency '94	Quadrat Frequency '99	Pellet Transect Days Use/Acre (ha) '99
Sheep	-	1	0
Rabbit	14	53	N/A
Elk	8	1	0
Deer	36	40	84 (207)
Cattle	-	1	7 (17)

BROWSE CHARACTERISTICS --
Herd unit 14 , Study no: 9

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata wyomingensis																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	1	-	-	1	-	-	-	-	-	2	-	-	-	40			2
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	94	1	3	-	-	-	-	-	-	-	4	-	-	-	80			4
	99	-	-	-	1	-	-	-	-	-	1	-	-	-	20			1
M	86	9	15	-	-	-	-	-	-	-	20	4	-	-	1600	20	19	24
	94	23	43	13	-	13	-	-	-	-	90	-	2	-	1840	20	33	92
	99	22	62	12	-	5	10	-	-	-	111	-	-	-	2220	23	31	111
D	86	10	8	7	-	-	-	-	-	-	15	2	-	8	1666			25
	94	28	23	4	3	25	-	-	-	-	27	1	10	45	1660			83
	99	15	20	14	-	2	3	1	-	-	32	-	-	23	1100			55
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	780			39
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	1560			78

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	46%	14%	16%	
'94	60%	09%	32%	+ 7%
'99	53%	23%	14%	- 7%

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	3332	Dec:	50%
	'94	3580		46%
	'99	3340		33%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus viscidiflorus stenophyllus																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
	99	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
M	86	2	-	-	-	-	-	-	-	-	1	-	1	-	133	9	11	2
	94	22	-	-	-	-	-	-	-	-	22	-	-	-	440	10	18	22
	99	8	-	-	-	-	-	-	-	-	8	-	-	-	160	12	16	8
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	33%	+59%
'94	00%	00%	00%	-38%
'99	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	199	Dec:	0%
	'94	480		0%
	'99	300		27%

Gutierrezia sarothrae																		
S	86	53	-	-	-	-	-	-	-	-	53	-	-	-	3533			53
	94	13	-	-	-	-	-	-	-	-	13	-	-	-	260			13
	99	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
Y	86	56	-	-	-	-	-	-	-	-	56	-	-	-	3733			56
	94	29	-	-	-	-	-	-	-	-	29	-	-	-	580			29
	99	163	-	-	-	-	-	-	-	-	163	-	-	-	3260			163
M	86	127	1	-	-	-	-	-	-	-	128	-	-	-	8533	8	6	128
	94	237	3	-	-	-	-	-	-	-	240	-	-	-	4800	5	6	240
	99	798	-	-	1	-	-	-	-	-	799	-	-	-	15980	7	8	799
D	86	9	-	-	-	-	-	-	-	-	8	-	-	1	600			9
	94	5	-	-	-	-	-	-	-	-	-	-	-	5	100			5
	99	17	-	-	1	-	-	-	-	-	3	-	-	15	360			18
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	180			9
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	920			46

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	.51%	00%	.51%	-57%
'94	01%	00%	02%	+72%
'99	00%	00%	02%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	12866	Dec:	5%
	'94	5480		2%
	'99	19600		2%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Opuntia spp.																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	8	-	-	-	-	-	-	-	-	8	-	-	-	160			8
	99	5	-	-	-	-	-	1	-	-	5	-	1	-	120			6
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	12	-	-	-	-	-	-	-	-	12	-	-	-	240			12
	99	5	-	-	-	-	-	1	-	-	5	-	1	-	120			6
M	86	2	-	-	-	-	-	-	-	-	1	-	1	-	133	3	6	2
	94	13	-	-	-	-	-	-	-	-	13	-	-	-	260	2	10	13
	99	5	-	-	-	-	-	1	-	-	5	-	1	-	120	3	7	6

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	50%	+73%
'94	00%	00%	00%	-52%
'99	00%	00%	17%	

Total Plants/Acre (excluding Dead & Seedlings)				
'86	133	Dec:		-
'94	500			-
'99	240			-

Sclerocactus																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	3	9	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	00%	
'99	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'86	0	Dec:		-
'94	0			-
'99	0			-